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ABSTRACT

The task group report presented in this publication is one of a series prepared by eminent psychologists who have served as consultants in the U.S.O.E.-sponsored grant study to conduct a Critical Appraisal of the Personality-Emotions-Motivation Domain. In order to achieve the goal of identifying important problems and areas for new research and methdological issues related to them, an approach was followed in which leading investigators in specialized areas were enlisted as members of task groups and asked to reflect on their current knowledge of ongoing research and to identify the research needs in their respective area. The articles in this report are: (1) Trait Structure, Multivariate Approach (Cartwright); (2) Methodological Issues in Trait Structure Research: Three Assessment Psychologies (Krause); (3) Observational and Rating Methods (Fiske); (4) Self-Report Methods (Comrey); and (5) Objective Tests (Hundleby). (Author)

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## FOREWORD

The task group report presented in the following pages is one of a series prepared by eminent psychologists who have served as consultants in the U. S. Office of Education sponsored grant study to conduct a Critical Appraisal of the Personality-Emotions-Motivation Domain. The study was planned with the advice of an advisory committee including Professors Raymond B. Cattell and J. McV. Hunt (University of Illinois), Donald W. MacKinnon (University of California, Berkeley), Warren T. Norman (University of Michigan), and Dr. Robert H. Beezer (USOE) and follows a topical outline included as an appendix to the present report. In order to achieve the goal of identifying important problems and areas for new research and methodological issues related to them, an approach was followed in which leading investigators in specialized areas were enlisted as members of task groups and asked to reflect on their current knowledge of ongoing research and to identify the research needs in their respective areas. The general plan is to publish these reports as a collection with integration contributed by the editors. It is hoped that these reports will prove to be valuable to research scientists and administrators.

S. B. Sells, Ph.D.
Principal Investigator

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Appendix: Outline for PEM Study Adopted for Planning Purposes

# I. Trait Structure, Multivariate Approach

Task Group Chairman

Desmond S. Cartwright

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Each day is the first day of the rest of a man's life; and each day is the first day of the rest of a scientific discipline's life. How many days does the multivariate approach to trait structure have left? If some voices are to be taken seriously (Walter Mischel, B. F. Skinner, for example), the trait approach in general is already out of date, ought to be defunct, and at any rate is hopelessly wrong, for there are no "dispositions", no "structures", no "traits". Or, even if there were such existents, they have no causal relationships to individual behavior; for all behavior is determined by an individual's reinforcement history and the momentary effective situation. Persons behave quite differently when treated differently by the environment. Persons behave quite differently in one situation from their manner in another situation. All behavior is situation specific: any commonalities in an individual's behavior across situations are due entirely to the commonalities (identical elements, stimulus similarity gradients) of the situations.

From another front come other attacks upon the concept of trait. Humanists, existentialists, prophets of the higher consciousness, all have voiced their opposition to the view

that man has any fixed characteristics, stable over time, limiting the range of his accomplishment possibilities, and determining the broad paths of expression his needs must take. For them, man is a beginning perpetually; he forever faces the void of human choice; he can always choose to be something other than he has previously been.

Other attacks come from other fronts. Each field has its roster of evidential supplies and ammunition. What evidence exists for the viability of the trait structure approach? Actually there is a vast amount of such evidence, ranging from the undoubyed dependability of most good measures of general intelligence to the sharp clarity of the second-order factor structure in the 16 Personality Factor Questionnaire, replicable to within half a decimal point of factor loadings across diverse populations and cultures.

The trait approach is robust and likely to be a healthy contributor to psychological science for the indefinite future. Such a conclusion would certainly be endorsed by the four distinguished scientists whose papers are collected in this section. Each takes it for granted that the multivariate approach to trait structure is not only sound but also fundamental for psychological science. Each is persuaded that there will be a future to the field that will extend to some years at least, years of profitable enquiry and technological development.

Krause considers the overall state of methodology in the field. He addresses the fundamental problem of the actual trait-assessing situation. There are three fundamentally different types of assessment, he says: first person, second person, and third person assessment, represented as FPA, SPA, and TPA, respectively. TPA is the usual testing situation, in which the purpose of assessment is to affect the subject in some way (select, classify or diagnose him, for example). SPA is the construal of another person using one's own implicit personality theory, as in an encounter group setting. Here the "trait structure" is really a "cognitive structure" sitting inside the observer's (or encounterer's) head. In FPA the assessor is essentially like a client-centered therapist: his aim is to understand the person in a way that will be beneficial to the person; he must <u>discover</u> the person's unique traits rather than <u>construe</u> them.

The success of all three types of assessment depends upon the subject's willingness to disclose himself. Thus we have a correlative typology of disclosure: FPD, SPD, and TPD. In the end all types of assessment are dependent upon the disclosure of the subject, but TPA is especially vulnerable since it makes no provision for self-correcting exchange. The vulnerability lies in the fact that the subject may have a different purpose for the assessment than does the administrator, often a counter-purpose, such as to give a socially desirable impression, fake poor, or get it over with as quickly as possible (rather than as validly as possible).

Krause believes it is possible (but unlikely) that "trait structures" emerging from the three different types of assessment may converge some day. At any rate, the central methodological problems of the near future lie in resolving the dilemmas of the assessment situation, its purposes, and its relation to the ambient culture.

The social situation of assessment and the implicit personality theory of the assessor provide themes for variations offered by all three other scientists contributing to this section. Additionally, each has themes unique to his topic.

Fiske deals with ratings, and points to the central difficulty of such methods: ratings may be made more precise and reliable as measures only to the extent that the behaviors involved are narrow and specific. Yet obviously the most useful applications of ratings are those that appraise broad and meaningful substantive concepts of personality. These are not to be found on one occasion in one restricted experimental setting; rather they must be sought from observations over a wide variety of situations and over extended periods of time. But the wider the behavior set and the longer the period of observation, the less likely are different observers to reach agreement. Fiske explores some of the reasons for these facts and makes seven specific proposals for research aimed at the problem of maximizing meaningfulness and minimizing error in ratings.

Fiske also calls for further research into the "implicit personality theories" of raters and into the social relations of raters and ratees. There are expected differences between self-ratings, peer-ratings, and ratings by supervisors, or friends, or other persons. How are these different "points of view" related? Where do they converge? Where do they diverge? Are there greater agreements across rater classes when the behaviors are very specific? Which classes agree better with behaviors of intermediate specificity or with traits of high generality?

Comrey discusses self-report methods of assessment. He foresees a new social organization and scientific discipline to meet the demands of modern accomplishments in the trait approach. There are hundreds of traits and hundreds of self-report measuring devices in existence now. What is needed is agreement as to the basic few variables that we should concentrate upon. This means that there must be created a means and some criteria (such as a commission to set standards for selection of the list of acceptable variables). The trait approach has been so prolific it has yielded a level of productivity that now requires systematic social control and guidance.

In addition, Comrey speaks directly to the matters which make the trait approach a target for hostile snipers: low reliability, low validities, poorly worded items, ambiguous phrasing, and so on. There should be created a <u>science of instrumentation</u>, he suggests. The social organization and

the science of instrumentation would aim for two closely related objectives: the selection of an agreed few personality variables; and the selection and development of the best possible self-report measuring instruments for those variables. Over several years of programmatic research, these would lead to the formulation of mathematical and conceptual relationships between the variables so measured. In other words, the science of instrumenation would lead to a fully developed science of individual differences.

Hundleby explores the opportunities presented by "objective" tests of personality constructs. These tests, of course, are those whose purpose the subject ordinarily cannot figure out; or, if he can, it does not allow him to bias the outcome. An extreme example is a blood test; another is the measurement of GSR to a sudden noise. If successful, such devices obviously solve the problem of bias due to willful distortion by the subject, but it is not generally known what <u>other</u> kinds of bias they may be responsive to (such as the effect of circadian rhythms, ambient cyclonic conditions, etc.). Hundleby foresees attention to extensive development of knowledge about objective test devices as these are studied in relation to external criteria (life events in particular), changes in the state of the organism, changes with time (development), in relation to genetic inputs, and in relation to the other main classes of assessment method (self-report and ratings).

All four authors actually treat the problem of situational influence upon test scores in one way or another. There is, then, continuing interest in the role of the situation, both as it influences behavior and as it affects test data. It is strange that situational specificity theorists fail to see the intaglio character of their subject matter. For situational specificity may be seen also as situational non-specificity; in that light, it is the essential subject matter of such considerations as those on reliability, stability, homogeneity, dependability, factorial simplicity, factor congruence, and so on. These topics are central to all psychometric theory. As a matter of fact, one might say that Charles Spearman was the original specificity theorist, since his two-factor theory of intelligence explicitly called for both general factor and specific factor contributions to the variance of test scores.

Recent work by Cronbach and his colleabues (dependability), by Cattell (Universe factor scores and situational modulators), and by Sells and his colleagues (dimensional analyses of situational modulators), are among the latest manifestations of the continuing attention that trait theorists pay to the situation. Even as a steel bridge may collapse if you place sufficient quantities of dynamite in the right position, so even the strongest of traits may fail to be manifested in trait-expectable behavior under extreme pressure of situational determinants. Research is urgently needed on the limits of situational variation under which given trait levels will continue to permit effective prediction of behavior.

## II. Methodological Issues in Trait Structure Research: Three Assessment Psychologies[1]

Merton S. Krause

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How we construe ourselves and others in temperament or style depends on the available terms of construal such as trait terms, and this is, at least in part, a cultural matter. Since the subjects of personality research are also, at some remove, its consumers, trait research can both alter these cultural forms and apply them in an identity constraining way to individuals. Thus, what people are or can be depends in part on what personologists create for them: some may find a good fit for themselves, some may construe counterpersonalities to the proposed terms of appraisal, some may reject any constraining construal, and some may attempt (perhaps, even by more research) to alter the prevailing personality theories. We know extremely little about the cultural system properties of personality research and so too little to judge whether it can ever hope to converge, what functions it actually serves, or what its personally reactive and system feedback consequences are: these are the truly pre-emptive issues for methodological study.

It is clear, however, that we do not attempt our construals of others without purpose and that our purposes can be roughly

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[1]I shall cite papers of my own which further develop points alluded to below, rather than more fully develop these points here.

categorized in accord with the type of psychology we adopt for the subject of our construal (see Krause, 1970a). If he is a creature to be affected, as he is in the prevailing third person or objective psychology, then prediction (to guide our investments in such things as his education or treatment) or control of his actions is our purpose. If he is a fellow to be communicated or communed with (or even taught as a self-directed peer, in a student-centered manner), as in the emerging second person or encounter movement psychology, then our empathic understanding of him to realize a psychological community is our purpose. If he is a unique individual to be enjoyed for his special quality (in a way that would, e.g., allow teachers to be alive to their students' virtues and actualization and give these teachers satisfaction), as in first person or traditionally humanistic psychology, then appreciative understanding is our purpose. Not only the terms of appraisal, but the conditions of assessment and the strategy of achieving our purpose through research must differ according to purpose. Thus, there must be at least three methodologies of trait structure (i.e., personality theory) construction and discovery; for third, second, and first person assessment: TPA, SPA, and FPA, which can be somewhat forecast.

TPA. The best terms for depicting a person whose actions are to be predicted or controlled are those that best give us the prediction or control we seek, which is conditional upon the investment or control policy options available to us.

E.g., they yield a linear combination of scores which correlates well enough with our criterion variables (like facts learned, job holding duration, marital satisfaction). This requires that we augment any given trait space with a criterion space (and an intervention space when control is our purpose and the role that the personality construals serve in guiding control actions is known) in order to define optimal trait structures: conditionally best structures or theories of the middle range. Factoring in the trait space alone is useless, unless we already know that the criterion vectors substantially span the common factor space. The trait space itself may be designed to be universal or purposefully limited on the basis of some predictive or causal theory (of, e.g., education, health or influence). Failures of correlation call for raising the reliability of measurement in securely universal trait spaces but may also require enlargement of a limited space. The magnitude of the assessment task for a universal space may deflate reliability or distort the space with measurement bias, but the apparent purpose (to subjects) of an assessment (which must be less ambiguous with more limited spaces) is especially susceptible to counter-purpose bias. In fact, there is always some ex ante conflict of interest between the assessor and the assessed when the latter believes his fate may depend upon how he is construed. To insure our prediction-control purposes, therefore, we must either manifestly serve the subjects' purposes or attempt to predict or control interfering apprehensions

or biasing sets that subjects adopt to protect themselves (Krause, 1965 & 1970b; and if this attempt involves further assessment, we have the start of a vicious regress, like a social desirability set in rating social desirability): here the assessor's utter dependence on his subjects is a fact and sometimes a problem. It may be that only field studies with unobtrusive measures may be satisfactory, where they are ethical.

SPA. Communion between persons may well require mutual construals in different terms than afford the best objective prediction or control of their actions. Their mutual trust and openness, acceptance of (if not consensus in) each other's attitudes and beliefs, understanding, cooperation, etc., are the criteria against which trait structures may be fashioned or validated. The personality construals must themselves meet these criteria in their means of development and in their nature: assessor and subject are interdependent persons and inseparable roles here. This makes trait spaces necessarily limited, provisional and open; and trait structures tend, by negotiation, toward isotrait-heteromethod colinearities (and, perhaps, toward the parties' implicit personality theories or heterotrait conceptual aprioris, though the information to organize has become richer and the opportunity to see deviant or unpopular action greater) as the assessments are themselves brought into the relationship. Whatever either party seeks to know about the other or himself represents an opportunity for and a challenge to their relationship. It is how well their

construals of each other and of themselves facilitate their successfully taking such challenging opportunities that measures the degree to which assessment serves their communal purposes. Longitudinal studies of the development and maintenance or degradation of communal relationships and of the concurrent development of these cognitive (trait) structures or theories may yield something about the nomothetics (beyond current attribution theory) of optimal trait structures in second person psychology.

FPA. One person's appreciative understanding of another must start with what the one values and what he knows of the other. His assessment should focus on discovering in the other what traits the one already values and, in himself, what traits of the other he will come to value. This implies some evolution of his apriori trait space, of his value distribution over this space, and of his construed trait structure or theory of the other. For his own actualization, the assessor's strategy should be more one of discovery than of construction since efficiency in attaining good structure is not critical here (as it is in third person assessment) since closure is not properly possible, especially in the appreciative understanding of one changing person by another changing person. The assessment conditions under which this understanding is pursued should, at best, induce the subject to bloom, to become his most beautiful (in all respects), and the assessor to become his most entirely present.

Structure measurement technology is still underdeveloped and underapplied where it is developed, but the development issues differ among TPA, SPA and FPA.

Validity. Trait structure construals may serve their purposes in TPA but still be measurement invalid, because the meaning of the traits is or has become ambiguous through trait structure anomalies, assessment content improprieties or biasing intrusions (Krause, 1967 & 1972), although such invalidity is not then serious for TPA. Even statistical invalidity (or distortions in estimated structure) may not be serious, depending on the input bias robustness of the investment or control policies which supply the data. In SPA, however, invalidity is rejection of one's structural construal by the other and so is most serious, sometimes even fatal, to the relationship. Invalidity is only one more obstacle to closure in FPA, when the assessor finds his trait structure attributions too vague or ambiguous for himself.

Assessment Situation Convergence. Just as there are different assessment psychologies, there are also different subject psychologies for disclosing their trait structures: to manage a useful impression, TPD; to develop a communal relationship, SPD; or to actualize what one is, FPD. It would seem that TPA and FPA demand FPD, but FPD demands FPA, and SPD and SPA demand each other.

Generalizability. If discriminable applications of all available and equally valid assessment instrumentalities yield

notably different trait structures on the same or equivalent subjects, then these construals will only be useful in TPA if either we can settle on a useful enough subset of these instrumentalities and their applications (Krause, 1969) or the investment-control policies are robust enough for such input unreliability. In SPA this unreliability would tend to destabilize the relationship or be another topic for coming to an understanding. While in FPA, again, unreliability is another possible obstacle to closure, but then closure is not desirable in FPA.

Structure Measures. The recursive bivariate systems (with partialing) of expressing the inter-relations in a set of measurement series are traditional in TPA, especially the linear ones of correlation and regression. These have been convenient for getting work done, but surely it is time to explore seriously truly multivariate measures of structure characteristics (e.g., of densely occupied subspaces and their shapes or of Smallest Space analysis) and less assumptive structure-to-criterion mapping measures. Such formal procedures might be of interest even for idiographic work in TPA or to explore for nomothetics about SPA or FPA, but it seems unlikely that they would be of much use in SPA or FPA. When we have more understanding of acceptable own and other's trait structures and spaces (or identities), proper SPA measures (like, perhaps, total discrepancies of ideal or acceptable identities weighted for importance) may be developed. Likewise, measures of real-ideal

discrepancies in a joint real-ideal space may be useful in FPA.

Structure Convergence. Both within and between TPA, SPA and FPA and between persons or homogeneous classes of persons (as well as longitudinally idiographically in the three psychologies) trait structure convergence is possible. It is not, however, necessary, and so congeries of personality theories may be needed after all. The ends of assessment, the means of attaining these ends, and the persons and situations involved may well requite different theories or structures, but in what parameters ought these structures differ?

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# III. Observational and Rating Methods

Donald W. Fiske

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A rating or a recorded observation is the product of an action by a rater (or observer) responding to two major kinds of stimuli: a rating form instructing the observer (O), on which the judgment is recorded, and the behavior of the ratee or subject (S). The O's task is to map or integrate his perception of S's behavior into the terms of the rating scale framework. While the rating form is constant over time, the way O perceives the form may vary slightly over time, depending upon O's internal state and his prior experience with the form. Also, the way O perceives S's behavior may vary for similar reasons. Much more important is the variation in the other stimulus: S's behavior while being observed by O is a function of S/s internal state, the total situation and the immediate stimulation impinging on him. Hence a major problem is how O is to arrive at a single rating reflecting the designated aspect of such continuously varying behavior.

Ratings are a major mode of observing aspects of personality since one central meaning of personality is how a person is perceived by others. Thus peer ratings are often an ultimate criterion in themselves and can be validated only by face or construct validity approaches, not by criterion-oriented methods. Taken as important in their own right, ratings share

with other basic modes of observation many of the fundamental problems of personality and its measurement.

Ratings are of two major kinds: the rater may observe S for a controlled period of time and make ratings based on this observation; alternatively, the rater may base his ratings on recollections of his prior observations of S over a more or less extended period. While a limited observational period, as in a situational test simulating real life, permits greater structuring and control of background conditions, it typically yields ratings highly specific to the particular situation or at least to that class of situation. Ratings based on naturally occurring associations with S obviously are poorly controlled because of unspecifiable situational effects, in addition to the complex and untrustworthy effects from the rater's screening of his recollections. (In this paper, rating and observation will be used interchangeably. The focus will be on ratings by peers, rather than on ratings by superiors, significant others, and such special classes of raters.)

The major theoretical problem in this area is shared by other forms of measurement: it concerns the personality variable to be measured. We are almost forced to choose between the quality of the measurements and the presumed importance of the data: more generalized and hence more meaningful assessments are usually of poorer psychometric quality. High interrater agreement and presumed accuracy can be obtained for very specific, brief acts. Most work using ratings, however, is

concerned not with such minute observations but with traits, i.e., with S's stable dispositions. The longer the behavioral sequence being summarized in each rating datum and the more general the substantive variable being rated, the lower the agreement between raters.

There is much specificity in ratings, specificity associated with the rater, the ratee, the variable being rated, and the sample of behavior observed. To obtain a dependable score for an S on a trait, there must be some sampling over situations (since any one situation may not elicit any behavior relevant to the trait) and over time (since manifestations of dispositions vary over time). Observations for these several samples can be combined clerically (e.g., by averaging) or judgmentally by the rater. In the latter case, different raters may weight differently the several kinds of manifestations of the given trait. We also know that such combining may be influenced by O's perception of the strength of other traits in S and by O's general perception or evaluation of S.

Thus, in order to get a trait estimate for an S, each rater must combine diverse observations. Then the researcher must combine ratings from different raters. The final average, while fairly dependable, is actually a rough summary of multiple discrete observations which are somewhat heterogeneous.

## Technical Aspects

Much work was done on ratings and on rating forms several decades ago. The results are well presented in Chapter 11 of

Guilford's classic (1954). Another excellent account can be found in Cronbach (1960), Chapter 17. In developing a rating scale, pretesting is obviously essential, to insure clarity of format. Technical terminology should be avoided. Applications of rating methods should ordinarily use four to eight raters for each S, to minimize effects associated with individual raters. The more manifest the disposition and the more circumscribed the unit of behavior judged, the higher the interjudge agreement.

## Needed Research on Ratings

Given the position that ratings are of interest in their own right, the fundamental problem is that of maximizing their dependability (their representativeness or their generalizability). The first seven proposals below deal with this matter.

1. For ratings in controlled and time-limited situations, what is the function relating number of situations observed to degree of consensus between judges? Of particular interest would be an investigation utilizing as heterogeneous situations as could feasibly be contrived. The criterion here might be the judgments of a separate set of raters who saw each S in other, and preferably many other controlled situations.

2. For ratings based on prior association with S, to what extent does the nature of that association limit or bias the rating? E.g., ratings could be obtained from three groups of peers: those seeing S only on the job; those seeing him only away from work, and those seeing him in both places. Are ratings based on only one of these contexts insufficient?

3. Ratings from contrived situations might be assessed in terms of their agreement with ratings based on diverse prior associations. If they did not agree closely, the investigator might argue that one set was more appropriate for his conceptual purposes or might conclude that the two types of ratings must themselves be combined.

4. How does O, the rater, perceive and execute his task? Little research, if any, has been directed to this question. Extrapolating from research on self-reporting, one can expect much individuality in each rater's approach to his task, in addition to some variation within the judgmental work of each rater as he moves from one S to another and from one trait to another. While general psychology has studied man as an information-processing organism, we still know little about how the input from the behavior of others is handled. Raters could be asked to verbalize their activities as they rate.

A more intensive investigation of this question could compare judgments with objective data for some traits which could be assessed both ways. E.g., raters could be asked to rate Ss' talkativeness and smiling during a limited time period. From videotapes of Ss' actual behavior during the observations, highly reliable counts could be made of interruptions, length of speeches, number and duration of smiles, initiations of smiling vs. smiling back, etc. The relationships between these more objective specific variables and the raters' rating would permit some assessment of those features of Ss' talking and

smiling which had most effect on the ratings. (E.g., is frequency, intensity, or duration weighted most heavily?)

The purpose of such studies would be to learn how to structure the task given the raters, how to instruct them so as to maximize the comparability of their ratings.

5. Can we improve rater agreement by developing our terminology for scales so as to increase the consensus on the meanings of the verbal stimuli used? (Studies of frequency words and other modifiers have revealed considerable variation in their degrees of consensus.)

6. If the same raters are to be used repeatedly (as in observations in contrived situations), how should they be trained to maximize their agreement with each other?

7. For such raters, or for raters making many observations in a research study, can each rater be calibrated so as to remove most of the idiosyncrasy in his interpretations of the rating scales and in his particular ways of perceiving Ss?

8. There has been considerable research on the implicit personality theories of raters - a concept referring to the disposition of raters to see linkages between traits. Are the findings suggesting such implicit linkages an effect associated with having each rater rate Ss on several variables at the same time? The ratings of O's who rate Ss on only one trait could be intercorrelated and compared to the pattern for raters rating several traits. Also, the degree of rater agreement within and between those two tasks could be determined.

9. It is known that ratings have varying degrees of agreement with scores or measurements from other sources, the degree being related in part to the type of variable. What are the qualitative differences between peer ratings and measurements from other modes, especially self-ratings and ratings by experts (e.g., clinicians)? A beginning might be made by comparing peer ratings with self ratings of Ss' behavior in one particular situation. Of special interest would be an investigation examining several levels of decreasing specificity or concreteness: e.g., from smiles, through friendliness, to general interest in people; from expressions of assent, to agreeableness, and then to general submissiveness. One might find that self-perceptions differed from peer ratings not only at the higher, more abstract level but even at the lower level of concrete, readily observed actions. If so, it would not be the combinatorial or inferring process which produced the qualitative and quantitative differences between the observations by different modes.

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## IV. Self-report Methods

Andrew L. Comrey

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In the writer's opinion, some areas calling for major research studies in the field of self-report methods are the following:

1. Determine what variables should be measured by self-report methods.
2. Determine what are the best self-report procedures to use for the measurement of these variables.
3. Develop superior self-report instruments to measure each of these variables.
4. Determine the mathematical relationships between these variables.
5. Develop a conceptual framework to organize the knowledge available about these self-report variables and their interrelationships.
6. Determine the relationships of these self-report variables to practical criteria of adjustment.

Some of the issues, questions, and difficulties involved in carrying out such research studies will be discussed briefly below.

1. What variables should be measured. In highly developed sciences there is some general agreement on a relatively small number of variables that constitute the quantitative foundation

of the science for descriptive and theoretical purposes. In psychology, and personality measurement in particular, there has been no agreement reached on a relatively small number of variables to be used. Indeed, there appears to be, if anything, a constant increase in the number of variables to be considered. Armchair theorists by the hundreds grind out their own pet instruments to measure their favorite variables in orgies of creative self-expression. It must be assumed that the hundreds of available self-report instruments in the personality area occupy a space of many fewer dimensions than there are instruments and that excessive redundancy exists among present measurement procedures. The question that needs answering is, "What are the variables to be measured and what variables are to be dropped?" "Which variables are to constitute the quantitative foundation for a science of personality?" It will require a major research effort to answer these questions.

A start in this area has been made by those research workers who have attempted to develop taxonomies of personality variables based on self-report methods, e.g., Cattell (1970), Eysenck (1960), Guilford (1959), and Comrey (1970). Unfortunately, there is considerable disagreement among these and other researchers on what the major variables should be. One major project (Sells, et al., 1969) has been devoted to resolving disagreements and conflict between two of these systems. Comrey, et al., (1968a, 1968b) have also compared these systems. Other such projects are needed. Beyond this, however, work is

needed to establish better criteria than mere consensus to make a determination as to whether a particular variable should or should not become one of the foundation stones of the quantitative system of measurement. Cattell, for example, has proposed simple structure as one criterion for making such a decision. Others, including the writer, have challenged the validity of this criterion.

2. What are the best self-report methods. Despite the proliferation of self-report instruments, the science of instrumentation in this field is at a very primitive level. Examination of a random sample of available instruments at even a casual level will quickly reveal poorly worded items, ambiguous questions, annoying formats, confusing tasks, low item variances, and numerous other flaws. A major research effort is needed to develop a systematic science of self-report instrumentation that will guide authors past most of these gaping pitfalls in test development. Some of the issues to be dealt with in the development of such a science include the following:

a. Is the criterion-keying approach a good one for developing usable instruments? Research by the author and others has shown that this approach tends to yield factorially complex variables. Is this acceptable or not?

b. How good is the factor analytic approach to developing self-report instruments? At what level in the factor hierarchy should the instrument be aimed if this approach is to be used, broad second-order level, highly specific level, or in between? What methods of factor analysis are best?

c. Should items be used or some other medium for measuring a given variable? Is the best type of item one which uses many categories of response on a continuum or is it adequate to use only a "yes-no" type of response continuum. Are forced-choice types of formats acceptable? Many respondents bridle at being forced to choose between alternatives that do not appeal to them. Does forcing them to do so result in better or worse data?

d. What is to be done about faking? The usefulness of self-report methods in personality measurement has been severely limited by the fact that respondents can and do cheat. Some instrument developers have sought to solve this problem by using specialized item formats that presumably force the respondent to divulge information that he would not otherwise give. Is it really possible to do this? Are present methods, such as forced-choice items, really successful in accomplishing this objective? If not, are there other methods that can do this job or is it better to depend upon detecting faking and make allowances for it in interpreting test results? How can faking on self-report instruments be detected most effectively? Is it possible to correct scores for faking and how good are such methods as the "k" scale on the MMPI for this purpose?

3. Development of the self-report methods. A major research effort in itself is the actual development of high-quality self-report methods for the measurement of specified variables. This phase of measurement is often approached in

a rather haphazard way. Easy approaches such as selecting items from existing item pools, having students write items, and so on, are not likely to prove adequate for the development of fine instruments. Years of work involving trial instruments, statistical analysis, refinement, and successive refinements are needed to produce the kind of instruments that will meet acceptable standards of quality. Once the main variables have been selected that are to constitute the accepted taxonomy of self-report variables, it will require several major research efforts to produce the needed high-quality instruments to measure these variables.

4. Determine the mathematical relationships. If consensus can be obtained with respect to a taxonomy of self-report variables to be used and if high-quality instruments can be developed to measure them, the next logical step is to determine accurately the mathematical relationships among these variables. Are these relationships linear or non-linear? If they are linear, how high are the correlations and do they vary from population to population? This information is crucial for the development of a suitable conceptual framework involving these variables.

5. Developing a conceptual framework. Having determined what the self-report variables are that make up the agreed-upon taxonomy and knowing the mathematical relationships among them, a major effort would be needed to develop a conceptual framework tying this knowledge together and relating it to the

larger body of psychological fact and theory. This research effort would be more conceptual than empirical in character although many empirical studies would be needed to establish needed connections with other systems.

6. Relating the variables to criteria of adjustment. If the foregoing efforts are to represent anything more than an academic exercise, they must be followed up by extensive research projects aimed at establishing where and how these measuring instruments can be used to predict success in real-life adjustments, at school, on the job, and in the home.

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## V. Objective Tests

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### Major Research Studies Now Needed

1. Sound appraisal of the extent to which constructs (traits) derived from objective tests are related to, or are perhaps identical to, constructs in other domains.
2. Cross-researcher studies to indicate the extent to which objective-test traits show common ground between different researchers. (This is within the objective-test domain alone, e.g., through comparison of Eysenck, Cattell, Witkin, and others).
3. Examination of the extent to which objective-test constructs show change and development over time - within an individual or within groups of individuals. Particularly important is the study of trait development from conception through to early adulthood, but all phases and ages of development should be studied from a non-static viewpoint.
4. Examination of the extent to which fluctuations in moods and states are demonstrable through use of objective tests. Some of the integrative work suggested in 1 and 2 above should also appear here. Highly desirable studies are the assessment of state change, as manifested in objective tests, over relatively short time spans as this is associated with: (i) different naturally-occurring conditions; (ii) the

experimental manipulation of the environment; and (iii) biochemical changes either occurring naturally or as experimentally induced.

5. Some research should be directed upon certain traits that already appear theoretically important and have been the subject of much prior research but retain more obscurity than is desirable. Such traits might include independence, neuroticism, anxiety, arousal.
6. Several large scale studies are needed that attempt to link objective test traits to a broad range of criteria and dependent variables. Thus rather than investigate which traits are related to, say, single indices of academic success, we should attempt to assess the proportion of criterion variance, over a wide range of dependent variables, that can be accounted for by objective-test traits. This needs to be done at different age levels. It is reasonable to suppose that some emphasis be given to socially important dependent variables. This would seem to be a crucial set of researches and is regarded as the most important presented here.
7. Further research is needed on evidence of genetic determination of trait variance. Special emphasis should be given to studies concerning methodological advances.
8. Study of the logical and philosophical bases of such issues as the trait (latent variable) approach in general, and the implication and definition of domains of measurement,

particularly as these involve objective tests. These are not empirical researches in the usual sense but my feeling is that we are long overdue on a systematic, scientific account on this matter.

## Major Theoretical and Methodological Problems Associated With These Researches

In general, our single over-riding theoretical problem remains the quest for soundly measured and accepted constructs as these may be derived from objective tests. The need to establish such constructs as acceptable scientific variables must have prime place in future research. Such a consideration permeates much of the following discussion.

### Cross-Domain and Cross-Researcher Issues

For too long we have lacked firm evidence on the extent to which such traits as anxiety or extroversion appear in different domains of measurement. Similarly within the objective test domain itself there is need for comparison of results from different researchers (i.e., of different theoretical systems and associated measures). Surprisingly little work along these lines has been done and this must be one of our first house-cleaning chores. Often enough the extent of redundancy can be only guessed at.

### Development of Personality Structure

The amount of research involving objective tests that is genuinely developmental in scope - in other words that comprehensively covers some specific section of a life-span - is tiny.

Thus only the most meagre of leads has come to us as to when and why traits develop, change their manifestations, show perhaps differentiation over time, and so on. Partly this is due to practical reasons; testing with objective measures is time-consuming and longitudinal studies involve much investment of time and money. Partly this is due to the absence of agreed-upon trait measures that can be relied upon for such investment. Partly, and importantly, there are major methodological problems that need clarification. The literature on change or development methodology as this relates to mathematical and statistical models (e.g., Harris, 1963) has had much less attention than, say, the cross-sectional multivariate area. More work is needed on such models and experience in their use with longitudinal data. Associated with this should be an attempt to utilize and integrate within the present multivariate framework such approaches as path analysis and Blalock's work on causal inference.

States and Traits

Objective tests have presumed relevance for all major constructs in the personality realm. This would include theoretical variables showing such short-term fluctuations as would be associated with states, moods, and motives. A rich vein of theoretical and methodological issues await the experimenter. We have yet to obtain an acceptable definition of classes of constructs in which relatively short-term fluctuation may be expected. To a fair extent this is due to absence of empirical

findings upon which theory may build. Thus we need more research such that a coherent picture may be derived from the results. Methodological problems here are much the same as with the section on Development. However, in addition we have the problem of the relation between such fluctuants and the more stable characteristics we call traits. It would be naive to assume that these are two independent classes. It may be that strategically the optimum move would be to obtain some level of confirmation on certain of these fluctuants and then to assess their relation to traits. Such work should be combined with attempts to manipulate the environment in order to examine the extent to which fluctuation may be shown to be dependent upon environmental changes. Not all environmental variables can be manipulated experimentally and here we may need to look at naturalistic studies involving such events as death of a close relative, occupational success or failure, marriage, financial gain or loss, and so on. Important information should come from biochemical correlates of state change. It would appear imperative, at this stage, that there be clear, unequivocal evidence that such fluctuants be demonstrated to have associative links with variables from other domains of measurement.

Concentration on Specific Constructs

Although the broad view has much merit at different times in scientific endeavour, this has to be balanced by intensive investigation of specific constructs where these can be seen to be, or are suspected of being, of prime theoretical or applied

importance. Such constructs, in this setting, might be: (a) Witkin's field independence (Witkin et al., 1962) or U.I.19 (Cattell, 1957); (b) the anxiety, neuroticism, and emotionality construct (or cluster); (c) arousal. The last two need both state and trait clarification.

Criteria for Evaluating Objective-Test Measures

It has been suggested elsewhere (Hundleby, 1973) that in our assessment of the scientific usefulness of a construct, specifically as derived from objective tests, that we should take into account both 'internal' and 'external' criteria. Internal criteria concern the psychometric properties of measures of constructs. Without some estimation of the proportion of variance in the measure accounted for by the construct, and of the extent to which such measures remain valid in or over diverse situations and population sub-groups, it would be difficult to have confidence in the results of much of the research suggested in these pages. There is nothing new in this, but a review of the literature will suggest to the reader that much more care in this regard should be taken than is presently the case. No specific study is proposed to deal with this problem for it is assumed that such psychometric goals will be sought in most of these studies and thus that it should be a characteristic of much future research on objective tests.

External criteria concern, first, the extent of knowledge of the relation between any given construct and other, presumably relevant, constructs. This has been a rather neglected issue

apart from simple intercorrelations and the predictive weights observed in regression equations (where objective tests have been listed as predictors). Absent, for instance, is much intensive work or speculation on the relation between objective-test constructs and the whole area of ability and cognition.

For a construct to be given the time and money that are involved in research it should show salience for a broad range of 'real-life' criteria. This is the second aspect of external criteria. It is not sufficient that a measure be psychometrically respectable and that it show some associations (perhaps weak) with certain other measures; it should also be of explanatory value for the huge population of criteria and dependent variables that we suppose to show some inter- and intra-subject variance and social relevance. Such variables might include academic and vocational success, marital history, performance in small-group tasks, altruistic behaviour, clinical diagnosis. Such research poses no great methodological problems, for clearly it is in the spirit of canonical correlation analysis and its variants. Data collection, however, would be expensive and laborious for some degree of follow-up over a 2 - 5 year span is to be envisaged and the number of subjects would have to be large enough to assure unequivocal interpretations of results.

Research on Genetics

There is a constant need for research on genetic determination of objective-test traits. Some work has, of course, been

done by both Cattell and Eysenck, but clearly much more needs to be done. A major problem involves the experimental design and methods of analysis for such research. We need both appropriate and practicable research designs.

The Scientific Status of Personality Constructs

An abiding theoretical issue that affects most psychological measuring devices, and perhaps particularly objective tests which have a relatively short research history, involves the scientiiic usefulness of theoretical constructs such as traits, states, motives, abilities, and so on. The main answer to such a question is empirical and is reflected in most of the issues and researches suggested in this paper. Another source of relevant information however, would be to consider the development and use of theoretical constructs in accounting for human behaviour from the viewpoint of the philosophy of science. No research, as usually considered, is required, but the need is recognized for more and better discussion of the implications of objective tests and associated constructs in the science of psychology.

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# APPENDIX

Outline for PEM Study Adopted for Planning Purposes

(Detailed changes have been made by Task Groups at the discretion of group members.)

1000. PEM Aspects of Child Development

1100. Special Problems in Infancy and Early Childhood (birth to 5 years)

1101. Group care
   1. Effects of orphanage rearing, multiple mothering vs one-to-one mother-child (or surrogate mother) relations
   2. Related effects of environmental complexity

1102. Separation anxiety: fear of the strange

1103. Readiness
   1. General concept
   2. Special application to disadvantaged children

1104. Forced training ("pushing")
   1. In relation to "natural" intellectual limits
   2. In relation to readiness

1105. Sequential organization of learning
   1. In infancy
   2. In early childhood

1106. Parental involvement and influence on early development
   1. Effects of home environment, of implicit theories and practices of parents
   2. Manipulation of parental beliefs and practices, in enrichment programs

1107. Modes of learning and experience that affect early behavioral development
   1. Differential effects on anatomical maturation and behavioral development
   2. Correspondence between rates of anatomical and behavioral development
   3. Effects of environmental (experiential) enrichment and impoverishment, and cumulative effects with increasingly complex circumstances
   4. Hierarchical conceptions of intellectual development (Piaget)
   5. Development of learning sets and their implications for intellectual, motivational, and personality development; resistance of resultant behaviors to extinction
   6. Critical periods

1200. Child Socialization

1201. Conceptualization of the socialization process
   1. Socialization pressures
   2. Learning paradigms: e.g., dependency relations and adult control of "effects" (reinforcement), reference group formation

1202. Internalization of beliefs and values
    1. Conceptualization of attitude, belief, and value systems
    2. Identification processes
    3. Impulse control (self control)
    4. Effects of environmental resources
1203. Cognitive socialization
    1. Psycholinguistic structures, language development: effects on thought, beliefs, attitudes, interests; patterns of expression, values
    2. Uncertainty and information-seeking
    3. Development of expectancies; category accessibility; assimilation; effects on perception, cognition, action
    4. Symbolism, symbolic behavior

1300. Personality Development
1301. Developmental theories (Freud, Erikson, Piaget, Sears)
1302. Developmental sequences, stages
    1. Critical periods
    2. Fluid and crystallized patterns of intelligence (Cattell)
1303. Development of self-identity
    1. Self concept, ego theories, self theories
    2. Relations to social class, racial-ethnic factors, region, sex, family characteristics
1304. Effects of age, sex, culture, and other environmental factors
1305. Development of mechanisms of coping and adaptation

1400. Behavior Change
1401. Personality, learning
1402. Susceptibility to change of personality traits, attitudes, interests, beliefs, values
1403. Measurement of change
1404. Genetic, maturation, and learning factors in physical and psychological growth

2000. Personality

2100. Conceptual and Theoretical Approaches
2101. Criteria for a viable theory
2102. Development of unified, integrated theoretical formulations
    1. Cross-level comparisons and correlations
    2. Developmental histories of stable traits
    3. Relations among trait patterns at various developmental levels
    4. Relations of traits to perceptual responses in person perception and interpersonal interaction

2200. Cognitive Conceptions

2201. Cognitive style, complexity
2202. Balance theories
2203. Cybernetic formulations
    1. Computer simulation of personality
    2. Mathematical models

2300. Developmental Approaches (see 1300)

2400. Dynamic Approaches (see 1303, 4000)

2500. Morphologic Approaches

2600. Physiologic, Psychophysiological, and Biochemical Approaches (see 2102.1)

2700. Trait Structure, Multivariate Approach - Taxonomy of Trait-Explanatory Concepts of Stylistic and Temperament Aspects of Personality
2701. Methodological problems: definition of universes of behaviors for self-report, observation-rating, and objective test studies, cross-media matching of stable structures, design paradigms, including multi-modality designs and trait x treatment designs; construct validation of traits; effects of age, sex, sample, culture, and other environmental effects, and relations of these to resulting trait patterns; the range of roles and sets in relation to diversity of response patterns obtained (social desirability, acquiescence, and other specific sets), their similarities in terms of effects on self-description, and the relations of traits to moderator variables representing such sets
2702. Observational, rating methods: rater and "ratee" sources of effects in peer and "other" ratings, in observational trait assessment, and in interpersonal interaction; explicit concern with task, stimulus presentation, response format, socio-environmental setting, and demographic characteristics of participants; conceptual and empirical relationships among similar and related trait descriptors within observational-rating subdomain and in other subdomains (self-report)
2703. Self-report methods: item pools; format; item vs cluster factorization; measurement of and correction for response bias or distortion; development of a unified, consistent conceptual framework for concepts of personality style and temperament
2704. Objective test, misperceptive, indirect assessment, and development of fresh, new approaches to personality measurement and description

2800. Creativity
2801. Conceptualization of creativity; relations to intelligence, personality factors

2802. Characteristics of the creative person
2803. Analysis of the creative process
2804. Characteristics of the creative product
2805. Characteristics of the creative situation, short- and long-term; situational factors contributing to creative performance
2806. Measurement of creativity

3000. Emotions

3100. State Patterns: Physiological, Cognitive, Behavioral
3101. Arousal stimuli
3102. Response dimensions
3103. Uniqueness
3104. Learned-unlearned dimensions
3105. Affective learning; autonomic and physiological learning

3200. Relations to Traits, Roles

3300. Moderation of Expression by Learning
1. Culture patterns
2. Age, sex, group norms

3400. Drug Effects on Emotional Patterns

3500. Differentiation of States, Reflecting Situational, Organismic, and Stimulus Variations, from Traits, Represented as Long-Term Individual Dispositions

3600. Arousal States: Adrenergic Response, Stress

3700. Dysphoric States: Anxiety, Depression, Guilt, Shame, Remorse (see 4300)

3800. Duphoric States: Happiness, Elation, Joy, Hope, Confidence

4000. Motivation

4100. Conceptualization and Theory (human motivation)
4101. Homeostatic systems, physiological need
4102. Need-press system (Murray), subsystems (n Ach)
4103. Dynamic systems (Freud, Cattell)
4104. Cognitive and cybernetic approaches: motivation inherent in information-processing functions (Hunt), cognitive dissonance theory, incongruity, collative variables (Berlyne), balance theories, exchange theory
4105. Motivation inherent in individual performance, competence motivation (White)
4106. Trait systems and patterns (Guilford, Cattell)
4107. Values systems, moral character
4108. Conceptualization of interest, attitude, need, belief, value, ideal

4200. Process and Trait Formulations
4201. Relations and differences in conception and approach
4202. Process theories and formulations
    1. Balance theories
    2. Exchange theory
4203. Trait formulations: motives, values, character traits
    1. Methodology of measurement: Strong paradigm, Thurstone scales, Likert scales, Cattell's and Campbell's indirect approaches: self-report, objective, misperception, observation, rating, content analysis, unobtrusive measures
    2. Analytic approaches: factor analysis, multidimensional scaling, profile clustering
    3. Factored patterns of sentiments, attitudes, interests, beliefs, values
    4. Variations related to age, sex, sample, culture, and other environmental factors

4300. Frustration, Stress, and Anxiety
4301. Frustration theory and research evidence
4302. Conceptualization of stress
    1. Relation to frustration (Selye)
    2. Utility of stress concept in interpretation of behavior
    3. Relationships among physiological and psychological aspects
    4. Stress and coping, adaptation
4303. Adaptation-Level Theory (Helson) (see 5100)

4400. Conflict
4401. Conceptualization of conflict (Miller, Murphy, Cattell)
    1. Types of conflict: role, value, internal
    2. Approach and avoidance relations
4402. Conflict measurement and calculus
4403. Conflict in relation to interpretation and prediction of action

4500. Interests and Vocational Guidance
4501. Incremental value of interest measurement over ability and aptitude measures in predictions of various criteria on various populations (Thorndike, 10,000 Occupations; Clark, Minnesota study)

5000. Environmental Variables

5100. Conceptualization of Environmental Variables and Their Effects on Behavior; Human Ecology

5200. Methodologies for Encoding Environmental Factors

5300. Taxonomic Systems of Environmental Variables

5400. Normative Studies of Selected Behaviors in Relation to Defined Patterns of Environmental Setting: Sampling Problems in Relation to Populations, Behaviors, Macro- and Micro-Environmental Settings

6000. Interpersonal Behavior Processes

6100. Group Theory, Role Theory, Interpersonal Settings

6200. Interpersonal Perception, Attraction, Influence; Social Acuity, Empathy

7000. Variations in Psychological Processes

7100. Paradigms for such Research, Taking Account of Persons, Tasks, Environmental Settings, and Occasions (Cattell covariation chart, Campbell-Fiske model, longitudinal replication)

7200. Paradigmatic Studies of Selected Learning, Motivation, Perception, and Other Psychological Processes to Investigate Variations Attributable to Shifts in Subject, Task, Setting, and Occasion Dimensions

7201. Analyses to estimate magnitudes of variance components in standard dependent variables accounted for by trait, treatment, and trait by treatment sources and their specific constituents

7202. Analysis of total interaction parameter estimates into principal components or other dimensions in order to compare results by such methods with conventional R, P, Q analysis, both with single dependent variables and vectors (multiple dependent variables)